IMAGE

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CHARLES CHEVALIER AND THE "PHOTOGRAPHE A VERRES COMBINES"

The word **Photographe** was used indiscriminately for the lens and for the whole camera.

By R. KINGSLAKE, *Eastman Kodak Co.*

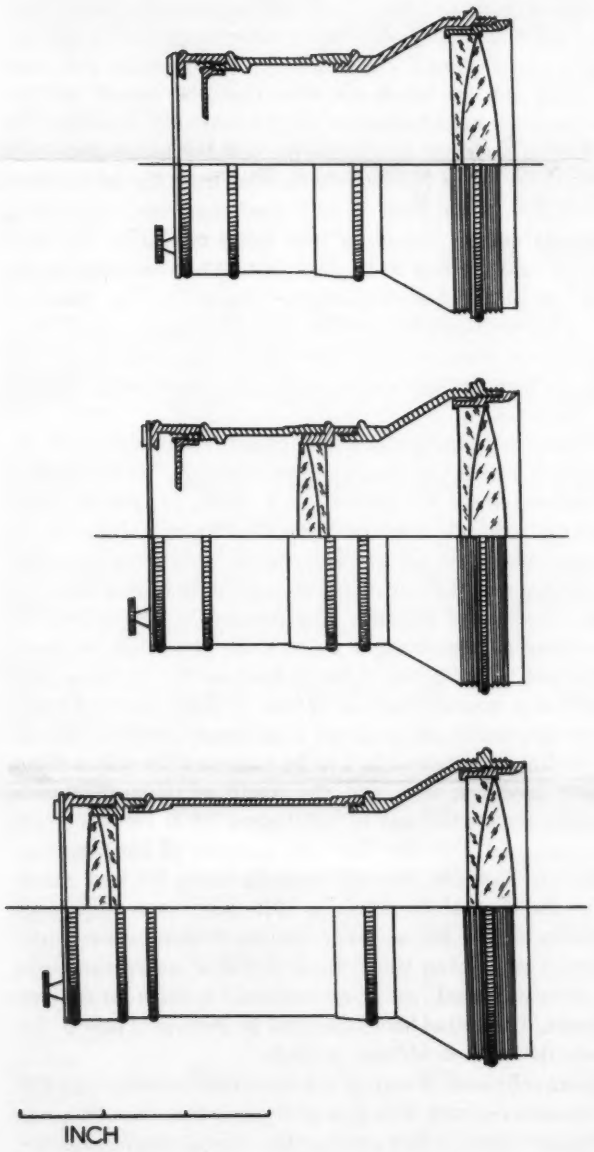

Figure 1—Three possible arrangements. Top: Rear lens above for landscapes. Middle: With additional lens to shorten lens for landscapes. Bottom: Arrangement for portraits.

CHARLES CHEVALIER was born in Paris on April 18, 1804. His father, Jacques-Louis-Vincent (1770-1841), and his grandfather Louis-Vincent, had been opticians, and it was natural that young Charles should follow in the family tradition. He soon developed great skill, but in 1832 he quarrelled with his father because he felt that he was being inadequately recompensated for his services and his valuable inventions. Thereupon with many regrets, a wife and little else, he left the family home on the Quai d'Horloge, Paris, and set up his own establishment in a shop at the Palais-Royal, Galerie de Valois, No. 163. Somewhere around 1847 or 1848 he moved to No. 158 in the same "Galerie," where he lived until his death on November 21, 1859.

Chevalier was a most energetic man, somewhat egotistical in character, and a voluminous writer besides being a competent lens and instrument maker. As a young man he had written two books on the microscope, one on spectacles, two on the camera lucida and camera obscura, and some shorter booklets. The daguerreotype seemed to facinate him, and during the fourteen years after its invention he wrote four books on photography. These are somewhat of a hodgepodge of detailed instructions, his personal memoirs, quotations from other writers, price lists, etc., but they contain a great deal of useful information.

At first, Charles Chevalier's main interest lay in perfecting the microscope, and at the National Exposition of 1827, he with his father jointly received a silver medal for their instrument. In the 1830's he developed a type of double objective comprising two achromats spaced apart, which could be used for either a telescope or a microscope. This invention won him a gold medal from the *Société d'encouragement* in 1834, and in the same year, he received a gold medal from the 1827 Exhibition jury for improvements in the microscope. Hence the sign* which was stamped on some of his

*It is strange that in this sign he completely ignored the platinum medal that he had received for the lens itself!

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later photographic objectives: Charles Chevalier/Deux Medailles D'Or en 1834.

The daguerreotype process of photography was announced to the world on August 19, 1839. Both Niépce and and Daguerre had known the Chevaliers for many years, and, in seeking a source of lenses for his cameras, Daguerre naturally turned to Charles. To make a lens that was capable of covering a sizeable angular field, Chevalier immediately recalled the suggestion made by W. H. Wollaston in 1812 that a camera obscura should be equipped with a simple meniscus lens having a stop on the concave side facing the distant object. Such a lens was found to give a much flatter field than the biconvex lens universally employed up to that time. However, as he was accustomed to achromatizing all of his lenses, Chevalier naturally thought of achromatizing the Wollaston lens too. In the end, for the "official" daguerreotype cameras made by Giroux, he supplied a well-corrected f/4 telescope objective of 380mm (15 inches) focal length and 81mm (3¼ inches) aperture, turned end-for-end so that the flat side faced the distant object. The huge spherical aberration naturally caused a very blurred image, so he stopped the lens down to an aperture of f/16 by means of a 24mm stop situated at a point 68mm (2¾ inches) in front of the lens. Actually it would have been better if the stop had been set further out, but this would have prevented the lens from covering the whole daguerreotype plate measuring 165x215mm (6½x8½ inches), representing an extreme angular field of ±20°.

The need for a lens of much greater aperture, particularly for portraiture, was apparent to all, and in the Spring of 1840 through the efforts of Baron A. P. de Séguier, a prize was offered by the *Société d'encouragement* for the best portrait lens to be submitted before the end of the year. Chevalier immediately set to work to develop such a lens, and his earlier work on the 2-lens microscope objective gave him an idea for a high-aperture photographic objective. He merely took his existing 15-inch achromatic landscape lens, moved the stop further away, and inserted a thin well-corrected achromat of fairly long focus between the stop and the main lens. This of course shortened the focus and raised the relative aperture. For use with a camera of "whole-plate" size, the added lens had a focal length of 800mm (31½ inches) and a diameter of 53mm, giving a combination of about 280mm (11 inches) focus. Using the same diaphragm opening as before, the additional lens raised the relative aperture to about f/10 to provide a shorter-focus lens for landscape purposes, but the aperture was still inadequate for portraiture. He then carried the same idea another step by moving the front lens forward by 20 to 60mm and removing the stop altogether. (Fig. 1) This raised the aperture to about f/5.2, but the high aperture was disastrous as far as the spherical aberration and field curvature were concerned.

In some of his more expensive "3-glass" sets, an interchangeable "Portraits" lens could be used as the front component, giving a still shorter focal length and a relative aperture of about f/4.9. The mounting threads were all alike and the component parts freely interchangeable to suit the user's requirements. Futhermore, as the inventor took care to point out, the whole objective could be turned end-for-end and mounted backwards on the camera if desired. (The definition then was much inferior, and the image decidedly astigmatic.) This feature was omitted from the later lenses.

Actually, as an f/10 or f/15 landscape lens, Chevalier's combination for "Paysages" was fairly workable. The field was inward-curving to be sure, but free from astigmatism, and the spherical aberration was negligible. The image of the flat plate projected out into the object space would be a curved arc centered approximately at the camera, and all objects lying on that curve would thus be sharply imaged on the plate.

Chevalier submitted this lens, which he called the "Photographe à Verres Combinés à Foyer Variable," to the *Société d'encouragement* on December 1, 1840. In March, 1841, although after the deadline date, the firm of Voigtländer in Vienna submitted one of their portrait lenses made according to the calculations of J. Petzval, the first of which had been constructed almost a year previously. The reason for the delay in submitting a lens for the prize has not been explained. The Society debated long on the problem, and finally at a meeting held on March 23, 1842, decided somewhat chauvinistically to award a platinum medal to Chevalier for his lens. Petzval had to be content with only a silver medal; however, time and the world of daguerreotypists came to his rescue, and by 1850 some 8,000 Petzval lenses had been sold while the Chevalier lens was all but forgotten. Although Chevalier was still manufacturing his lens almost up to the time of his death in 1859, and some more were made by his son Arthur, every optician in Europe was busily engaged in copying the Petzval objective under the name "Système allemand," and they continued to do so for the next 80 years. The actual lens submitted by Petzval is now in the Musée des Arts et Métiers in Paris.

There followed, of course, a long period of bickerings and recriminations, each side trying to prove that the other was a plagiarist, but the fact emerges that the convertible feature of Chevalier's lens was really what earned him the platinum medal, even though the image quality was admittedly inferior when the aperture was opened to a point that would be practically useful in portraiture.

Figure 2—The six lenses in the Eastman House Collection.

DESCRIPTION OF LENSES

The George Eastman House was fortunate in acquiring from M. Gabriel Cromer's unique collection no less than six specimens of this lens, which exhibit the various combinations described by Chevalier although none is a complete set (Fig. 2.) M. Cromer gave two more of these objectives to the Arts et Métiers museum in 1926. Owing to their being hand-made over a long period of years, the various mount designs differ in detail, but the components are completely interchangeable. All the lenses except one are intended to be used on a whole-plate camera (165x215mm); the last is for a ¼ plate camera (83x108mm). The cone-shaped lenses, of course, give much more illumination at the corners of the plate than the cylindrical forms, but the latter are very satisfactory on a smaller plate size. In Chevalier's 1844 catalog, the prices of these lenses ran from 55 francs for the ⅛-plate size up to 200 francs for the whole-plate size.

SUMMARY OF LENSES

FOCAL LENGTH (MM)

Body type	*Spacer*	*Approx. date*	*Rear alone*	*Whole system*	*Stops provided*	*Writing on edges of lenses*
Large cone reversible flange thread	Short, with sliding sleeve	pre 1847	400	(a) 280	(none)	(spun in)
Large cone reversible flange thread	Long	pre 1847	380	(a) 280	(none)	(spun in)
Large cylinder with rack and pinion	(none)	?	380	(b) 276 (c) 258 (no medal stamp)	(none)	(spun in) (Rear lens has writing which appears to be "tres bon")
Small cylinder, with rack and pinion	(none)	1848-51	260	(a) 208	Portraits (33mm) Portraits et Paysages (27) Paysages et Gravures (17mm)	(spun in)
Large cylinder with rack and pinion (Shutter missing)	Short	1854	420	(b) 295 (medal stamp)	Portraits et Paysages (27)	Front: 14 Juillet 1854 Rear: 4 Mai 1854
Large cone, and rear cap (not reversible)	Short (non-matching lacquer)	1856	430	(c) 300 (medal stamp)	Portraits (37mm) Portraits et Paysages (27mm)	Front: 8 0,bre, 56 Charles Chevalier Rear: 1r Aout, 5, 6
Very large cone type, marker's engraving. Swinging shutter missing (Overall length 180)	Short	1854	770	(c) 564 (with medal stamp)	Portraits et Paysages (36mm)	Front: 26 Janvier 1854 Rear: 6 Juin 1853

(a) Unmarked front lens at rear position (b) "Paysages" lens at rear position (c) "Portraits" lens at front position

In addition, the George Eastman House has a front lens, spacer and housing, with a pre-1847 address engraved on it. This may possibly belong with one of the complete objectives.

EASTMAN HOUSE IN PARIS

PARISIANS are enjoying this fall two historic exhibitions in their own city that have been presented with the co-operation of the George Eastman House.

The George Eastman House joined with the Bibliothèque Nationale of Paris in organizing the first exhibition of both paintings and daguerreotypes of Louis Jacques Mandé Daguerre, the French inventor of photography. Unique daguerreotypes—one signed by Daguerre himself—were lent to the exhibition, as well as original paintings.

The other display, on view in the Louvre, is an exhibit commemorating the centennial of George Méliès, the motion picture pioneer credited with having first developed trick photography and imaginative camera work in motion picture.

The Méliès exhibition is the first instance in the entire history of the Louvre in which motion picture materials have been exhibited as works of art in that famous Palace. The Méliès exhibition was organized under the direction of the French Film Library in association with the George Eastman House in Rochester and the Museum of Cinema in Turin, Italy.

The catalogue of the Louvre presentation which was prepared by Henri Langlois, head of the French Film Library acknowledges the assistance of James Card and George Pratt of George Eastman House.

In a booklet distributed at the Daguerre exhibition, Monsieur Julien Cain, General Administrator of the French National Library states "This exhibition, which opens at the same time as the XIVth National Salon of Photography, testifies to the very special interests which the Bibliothèque Nationale brings to an aspect of history which has long been neglected. It constitutes an important step in the preparation of a Museum of Photography, the need of which can no longer be challenged."

The catalogue also contains this short account of Daguerre's career as painter and inventor, signed by Jean Adhémar, Chief Curator of the Bibliothèque Nationale, and Beaumont Newhall, Director of George Eastman House.

"The name of Daguerre was in 1839 considered as the inventor of photography, perhaps because of the personality of the man who bore it.

"Certainly Niepce had his part in it, and we will render homage to him at one day soon, but Daguerre played a leading role because of his aggressive action and his personal prestige.

"He enjoyed it because he was a perspective painter, and this craft is the key to the whole story. Born in 1787 in Cormeilles-en-Parisis, having studied with an Orleans architect, then with Degotti, perspective painter and scenic artist for the Paris Opera, and finally with Prevost, the painter of the Panorama, he found himself at the end of the Empire a scene painter and in 1822 director of the Diorama. In the first part of the exhibition we present Daguerre as a painter. He exhibited at the Salon of 1814 a perspective view with exaggerated highlights and shadows (an opposition of contrast in which he always was interested) of the Church of the Feuillants (Louvre Museum), and he opened his Diorama—a kind of panorama in which by clever arrangement of lighting, paintings could be seen changing form. His Dioramas, done in collaboration with Bouton, a more gifted painter, were to be numerous and have much success in France, England, Germany, and America. But on March 8, 1839, the Diorama burned with its paintings and Daguerre gave up this spectacle.

"For ten years he had gradually lost interest in the Diorama for, since 1827, he had tried to fix on a sensitive plate the images of nature received in a camera obscura. After extensive experimentation—he freely admitted that he was ignorant of chemistry—he succeeded in 1838 (or perhaps earlier, in 1836) in making what he called daguerreotypes. The first daguerreotypes of Daguerre represented still lifes composed of shells and plaster casts of classical sculpture in a studio, then scenes of Paris. They required a pose of ten minutes for a subject in the shade and five for a subject in the sun. It will be noted that the human figure played no part in these photographs, except by chance.

'Daguerre did not attempt to make a portrait until 1841. It was of the king, and it was a failure. He only began again with his own family, in 1843. He undertook further research on instantaneous photography which he believed he discovered. But the immense throng of Daguerre's imitators were mostly interested in portraiture. We are exhibiting several anonymous portraits of 1842 and numerous others taken between 1843 and 1850. However 'daguerreian proofs' of landscapes were replacing drawings in the making of lithographic views.

"A series of complete original apparatus completes this evocation of an extraordinary person and a process which outlived him to 1860, that is to say nine years after the death of Daguerre (1851) and after the discovery of photography on paper.

"The exhibition presents a number of original daguerreotypes, never before brought together, by Daguerre, Foucault, Fizeau, by professionals and amateurs. The most beautiful are presented also in the form of photographic enlargements which prove their artistic value. Numerous documents of the period bring a most precious completion to the exhibition."

TRAVELING EXHIBITIONS

The Direct Approach
Wisconsin State College, Library, Wisconsin
November 27 to December 23

Gardner's Photographic Sketchbook of the War
University of Chattanooga, Chattanooga, Tennessee
November 1 to November 30

BEAUMONT NEWHALL, *Director* **JAMES CARD**, *Vice-Director* **NATHAN LYONS**, *Assistant Director* **GEORGE PRATT**, *Assistant Curator of Motion Pictures*
ROBERT DOTY, *Assistant Curator of Photography* **WARREN STEVENS**, *Curatorial Assistant* **JAROMIR STEPHANY**, *Curatorial Assistant.*

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